American Museum Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, N. Y. 10024

NUMBER 2403 FEBRUARY 18, 1970

Spears and Spear-Throwers of the Western Desert Aborigines of Australia

By Richard A. Gould[1]

INTRODUCTION

In February, 1966, my wife and I began a study of the economy and technology of the aborigines of the Western Desert of Australia. Field studies started with a week-long visit to the Aboriginal Reserve at Wiluna, Western Australia, followed in March by a three-month period of study at the Aboriginal Reserve near Laverton, Western Australia (including visits to the nearby Mount Margaret Mission). In June, 1966, we settled at the Warburton Ranges Mission, using it as a base for studies carried on continuously until June, 1967.

Despite the large size of the Western Desert, which is an area of roughly 250,000 square miles encompassing the Great Sandy, Gibson, and Great Victoria deserts of Western Australia and adjacent areas of South Australia and Northern Territory, the aborigines show remarkable uniformity of language and traditional culture throughout the entire region. The term, Western Desert Language (Douglas, 1964), has gained widespread acceptance among scholars working in this region to denote the numerous mutually intelligible dialects that occur in this area. At Wiluna the dialect encountered most often was Kaṭutjara; at Laverton, Mount Margaret, and Warburton, the predominant dialects were Ngatatjara and Nyatunyatjara. Aboriginal terms used in this paper conform

[1] Assistant Curator of North American Archeology, the American Museum of Natural History.

to these three dialects and follow the phonology proposed by Douglas (1964, pp. 10–19).

HISTORICAL NOTES

The first explorers to this region mentioned aboriginal spears and spear-throwers but said little about them. Ernest Giles, during his travels on the eastern fringe of the Western Desert in 1872, remarked on what he supposed were the virulent qualities of mulga wood (*Acacia aneura*) used by the aborigines for spearheads (Giles, 1889, p. 92). Not long afterwards Giles met two aborigines near the George Gill Range, and he described the weapons they carried:

"Each carried two enormously long spears, two-thirds mulga wood and one-third reed at the throwing end, of course having the instrument with which they project these spears, called by some tribes of natives only, but indiscriminately all over the country by whites, a woomerah. It is in the form of a flat ellipse, elongated to a sort of tail at the holding end, and short-pointed at the projecting end; a kangaroo's claw or wild dog's tooth is firmly fixed by gum and gut-strings. The projectile force of this implement is enormous, and these spears can be thrown with the greatest precision for more than a hundred yards." (Giles, 1889, p. 114.)

Unfortunately, Giles was uniformly careless in his observations of aboriginal life in the areas he explored, and there is good reason to doubt the accuracy of the details of these statements. John Forrest, while investigating the area near the Warburton Ranges in August, 1874, encountered three aborigines about whom he stated, "Each had two spears, very long and thick, and made out of three pieces spliced together, with large barbs on them." (Forrest, 1875, p. 229.) Forrest, although generally more accurate than Giles in his observations, said relatively little about the aborigines, perhaps because his encounters with them were infrequent.

The first detailed descriptions of the Western Desert aborigines were provided by Richard Helms, a member of the Elder Exploring Expedition of 1891. Helms collected vocabularies from aborigines in several parts of the desert and made an effort to describe aspects of their traditional culture. In his account of the Everard Range aborigines he provided the following notes, which are remarkable for their accuracy and detail:

"SPEAR, *Winda.* Two kinds: the one with a barb near the point, and the other with a smooth, flattened, and pointed head of hard wood about eight inches in length fastened to them. Some of the shafts are whole, and others made of two pieces, and spliced together. Sinews are

used for the splicing of the shafts and the fastening of the barbs, etc.

"SPEAR-THROWER, *Mira nakata.* In shape this implement differs considerably from all others of its kind. It is slightly curved backwards, convex at the back, and deeply concave on the upper side. On account of this hollowness, that will allow the spear to lie perfectly free between the hook and the hand, it is probably better adapted for its purpose than any other known. Length about two feet two inches, with three and a half inches in its widest part, narrowly tapering towards the handle. The hook is fastened with sinew and cement, and at the other end a piece of flint, that serves as a chisel, is attached with a lump of cement, which prevents the hand from slipping when the spear is thrown. The implement it will be seen, serves for making weapons and tools, as well as for flinging the spear." (Helms, 1896, p. 269). In addition to his descriptive notes, Helms included drawings of these implements in his report (1896, pls. 14 and 16).

More recently, ethnographers have provided detailed information on certain technical aspects of these tools, such as the manufacture and use of the stone adze hafted to the spear-thrower (Mountford, 1941, pp. 312–316; Tindale, 1965, pp. 151–154), repairing of spears (Sheard, 1964, p. 26), and the manufacture of spears and spear-throwers (Thomson, 1964, pp. 409–422), as well as general surveys of spears and spear-throwers in Australia that include some mention of the Western Desert varieties (Basedow, 1925, pp. 190–202; Davidson, 1934, pp. 41–162; 1936, pp. 445–483). Although accurate in most respects, these descriptions contain a surprising number of inconsistencies, particularly with regard to terminology and details of manufacture, and, even when taken together, do not provide a total picture of the place of spears and spear-throwers in the traditional life of the Western Desert aborigines. Thus the present paper will provide both a detailed and a rounded view of these important tools with the aim of showing how they form a part of the adaptation of the Western Desert aborigines to their physical environment.

LEARNING

There is little formal instruction on how to make or use spears and spear-throwers. From earliest infancy youngsters watch their adult male relatives making these implements in camp, and can often be seen imitating their actions using scraps of wood and stone found lying about camp. Young children sometimes take their father's spear-thrower or spear, or one belonging to someone else and play with it and, on occasion, damage it. Children, however, are generally indulged, and

such an incident is usually passed off as a joke. Mild chiding may occur if a young girl does this, but often as not, such an occurrence, too, is a source of amusement.

When children are fully weaned and old enough to roam about without constant supervision from their mothers (about five or six years old), they spend increasing amounts of time playing together in peer groups. Aboriginal children have nothing resembling competitive sports or games. Instead, their play consists largely of imitating the behavior of their parents. "Playing house" is a pastime that can reach elaborate proportions, with the construction of complete play camps about a half-mile from the main camp, and these activities are marked by firm recognition and emulation of the sexual division of labor of the Western Desert aborigines. Play of this kind involves the full range of adult behavior the children see daily, such as building shade shelters; making fires; catching and cooking small game; making impromptu digging sticks, spears, spear-throwers, and other tools. Children may pair off to play *kuri* (spouse) and, in the process, learn about the various section or subsection rules that will play a part in regulating their future marriages. Playing *kuri* also involves ridicule and other pressures, which appear to be more effective in establishing conformity to sex-determined roles than are the efforts of adults.

One of the most popular childhood pastimes is a game called *malu* (kangaroo) in which young boys fashion impromptu spears and spear-throwers from sticks and throw them at moving targets made from eucalyptus bark. These spears and spear-throwers are hardly what one could call finished tools, but the adult processes involved in manufacture are imitated by the boys in their play. For example, the toy spears are straightened by heating the shafts in the coals of a small fire, and bark covering the spear shafts is stripped away with the teeth. The game is played near a creekbed where eucalyptus grow in abundance. The outer wood (or bark) of these trees is cut away in a circular fashion to form a flat disk about 10 to 15 inches in diameter and about an inch thick. In most cases the disk is roughly elliptical in shape. While one youngster sends the disk rolling along the floor of the creekbed, the others hurl their toy spears at it. Because of its elliptical shape, the disk has a tendency to hop like a kangaroo, hence its name, *malu*, but, remarkably, the boys manage to hit this small and difficult target often. The game may go on for hours, with youngsters taking turns at throwing spears and rolling the disk. This is undoubtedly the same "spear and disc game" mentioned by Mountford (1962, p. 128) among the Pitjantjatjara-speaking aborigines near Ernabella, South Australia. A photo-

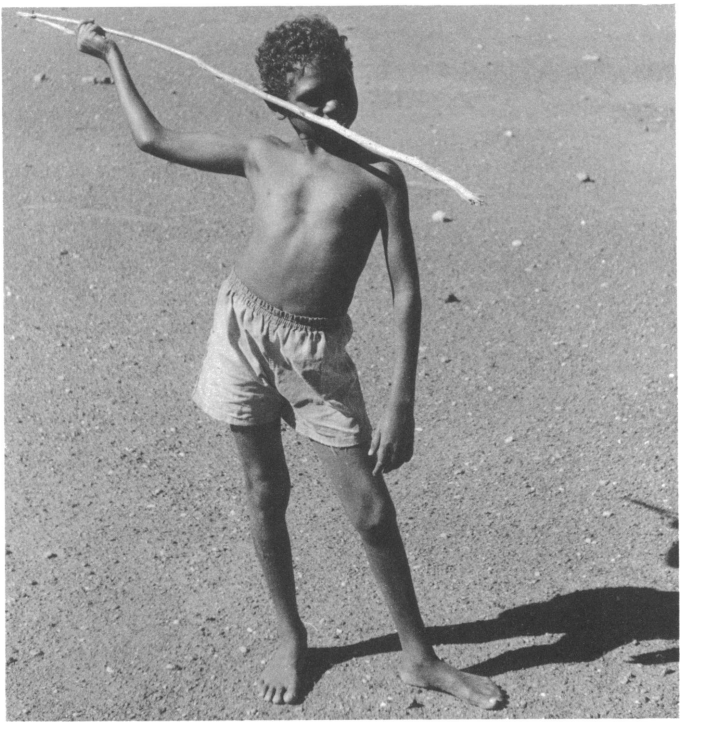

FIG. 1. Ngatatjara boy holding impromptu toy spear and spear-thrower.

graph of this activity was taken by Tindale during his 1935 visit to the Warburton Ranges (Tindale and Lindsay, 1963, fig. 89).

Young boys also enjoy imitating their male relatives by having play spear fights. In these, the youngsters use their toy spears and spear-throwers in a general free-for-all, and aim for one another's thighs, as adult men do. There are no sides in this sport, but sometimes one child is pelted by others who have ganged up on him. In some cases this process follows kinship lines in the sense that a boy's brothers may rush to assist him, but these groupings do not last long and may be broken up by brothers throwing miniature spears at each other (an aspect of play in which adult rules are consciously violated in fun).

Thus, when a boy is about 10 or 12 years old he has fully accepted the fact that spears and spear-throwers are associated exclusively with male activities, and he yearns to become proficient in making and using them. At this point the boy's father begins to take a serious interest in his son's acquiring skills with these tools. He generally makes a small

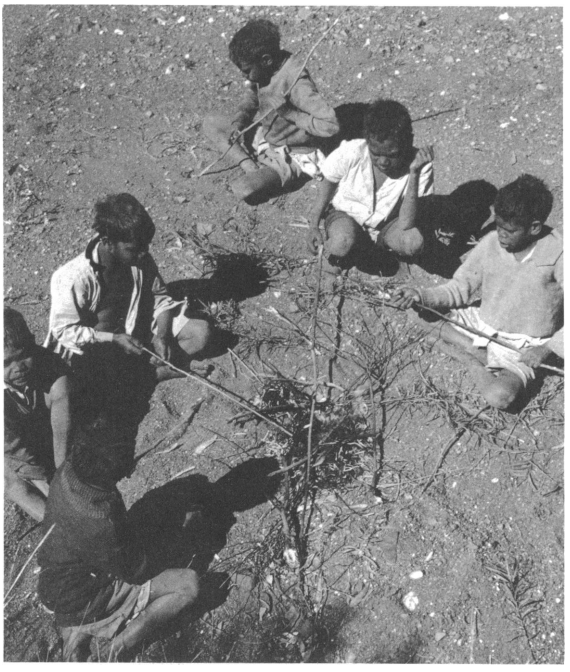

FIG. 2. Ngatatjara boys straightening toy spears.

FIG. 3. Ngatatjara boys throwing toy spears at rolling wooden disk.

spear-thrower and a set of small spears for his son to use in practice. As a rule, these small spears and spear-throwers are exceptionally well made, reflecting ties of kinship and affection. In many cases these items are elaborately decorated with incised sacred designs, the meaning of which is not explained to the boy. One of these toy spear-throwers and a toy spear are illustrated in figure 4. Ngatatjara and Nyatunyatjara

speakers call the small boy's spear *nyintji* (Douglas, 1959, p. 18), but there is no special term for the small spear-thrower. The toy spear is generally unbarbed, but the spear-thrower is complete in every detail, even including a chipped stone adze-flake hafted to the base with resin. The boy plays *maḷu* with other young boys, using his miniature weapons, and gains further practice by sometimes accompanying his father and other male relatives on hunts, during which he may practice by spearing small game. The boy uses these small weapons until he is 14 to 16 years of age, when he goes into the lengthy seclusion prior to circumcision and formal introduction to the sacred life.

After the rituals connected with circumcision are over, the young man regularly accompanies his father and adult male relatives on hunts. One of the first things he does is make his own spears and spear-thrower, under the tutelage of his adult male relatives. As usual, though, there is no attempt at formal instruction. By this time the young man has usually learned enough from observing his elders to find the appropriate materials and undertake the various steps of manufacture. The young man's male relatives act only to correct mistakes, and do so in an atmosphere which is deceptively casual and in which there is little conversation about the manufacturing task at hand. Although some individuals are recognized for their special skill in making spears or decorating spear-throwers, and sharing of weapons among kin is common, every adult male must be prepared to make his own spears and spear-throwers.

SPEARS AND SPEAR MAKING

The Western Desert aborigines distinguish between two basic classes of spears; *winta* and *kuḷaṭa.* The former is a barbless thrusting spear used mainly in fighting; the latter is a throwing spear (usually barbed) used for both hunting and fighting. A typical thrusting spear made from a single shaft of wood and without a barb is illustrated in figure 5A. Figure 5B shows one type of throwing spear, which is a composite, made in three sections.

Although referred to by the same term, the two types of throwing spear are different in appearance and in techniques of manufacture. They serve the same range of functions but reflect differences in ecology. The single-shaft spear is mainly a product of the desert fringe, where mallee and salmon gums (*Eucalyptus oleosa* and *E. salmonophloia,* respectively) are available for making long, straight spear shafts. Ngatatjara-speakers term the former tree *warilu* and the latter *pangkalpa.*

The dominant vegetation in these areas is mulga scrub, with the

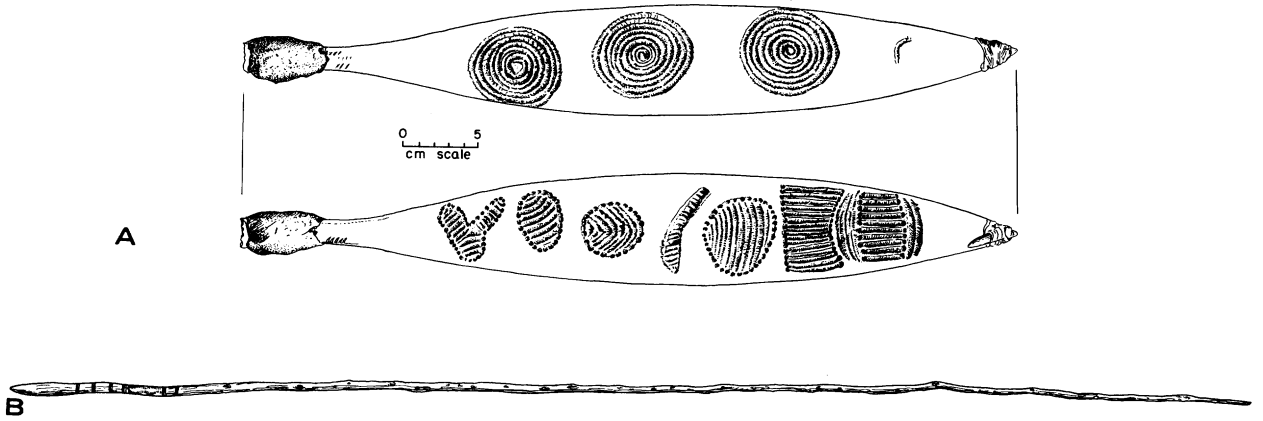

FIG. 4. A. Toy spear-thrower made by a Nyatunyatjara man at the Warburton Ranges, W.A. A.M.N.H. No. 80.1/4806. B. Nyatunyatjara toy spear from the Clutterbuck Hills, W.A. A.M.N.H. No. 80.1/4973a. Approximately $\times \frac{1}{13}$.

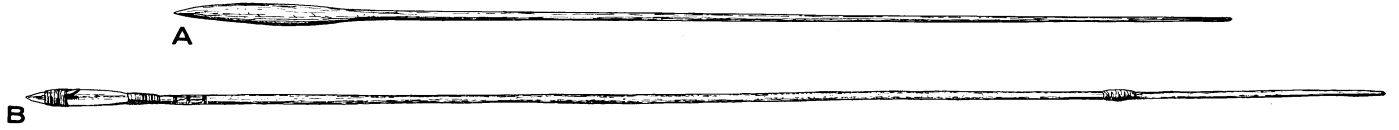

FIG. 5. A. Ngatatjara thrusting spear, Warburton Ranges, W.A. A.M.N.H. No. 80.1/4971. B. Ngatatjara composite throwing spear, Warburton Ranges, W.A. A.M.N.H. No. 80.1/4955. Approximately $\times \frac{1}{16}$.

eucalypts occurring most often along creekbeds and on limestone flats. Laverton and Wiluna both lie within this vegetation zone, with eucalypts comprising an extension of flora typical of the mallee areas to the south and west. Although extremely variable from year to year and place to place, average annual rainfall in the areas dominated by mulga-type vegetation tends to be near or slightly below 10 inches, with greater amounts occurring in the mallee zone and lesser amounts in the desert proper (Gardner, 1944, pp. lxix–lxxi). Accurate meteorological records are scarce for the Western Desert proper, but all indications are that the over-all annual average rainfall throughout the area is less than 10 inches. The dominant vegetation of the desert proper is spinifex (*Triodia* sp.) interspersed with scattered areas of mulga cover. For comprehensive discussions of the ecological differences between the mulga and true desert habitats in Western Australia, the reader is referred to Gardner, 1944; Leeper, 1949; and Wood, 1949. For the purposes of the present paper, however, the most important difference is the relative scarcity, in the desert, of trees with straight branches or trunks suitable for making spear shafts.

I observed the manufacture of 42 throwing spears at Laverton and Wiluna, and 16 spears (13 throwing spears, one thrusting spear, and two children's spears) at the Warburton Ranges and desert country to the north. All the throwing spears made at Laverton and Wiluna were of the single-piece variety; all of the throwing spears from Warburton and vicinity were composites. Some single-piece throwing spears were seen at Warburton, but inquiries revealed that, without exception, these spears had been made at Laverton.

Measurements made of these spear shafts are summarized and contrasted in table 1. With regard to composite spears, only the longest, or middle, shaft of each spear was tabulated, as it represented the longest piece of straight wood available. The mean over-all length for the composite spears (that is, including lengths of the appended sections at either end) is 117 inches. A comparison of the means of these two samples, indicates that straight pieces of wood usable for making spear shafts are 37.8 per cent longer along the desert fringe than they are in the desert. The attachment of front and rear sections to the main shaft of a composite spear serves to reduce the over-all difference. The desert-fringe spears are 13.7 per cent longer than the desert varieties. It should be mentioned that in the course of making the spear shafts for both kinds of spears the aborigines do not attempt to measure the length of the pieces of wood they plan to use in any way except by eye. For example, they do not use any kind of measuring device, such as a ruler, nor do

they take an old spear and use it for a guide or template. Throwing spears in a combined sample of seven composite and two single-piece examples were found to have a mean weight of 18.33 ounces, with the extremes in the sample ranging from 16 to 20 ounces.

The observed differences in the length of spear shafts can also be correlated with differences in the materials used and in the methods needed to secure them, which further reflect on the contrast in ecology between these two areas. Whereas only two species of tree suffice as sources of spearwood on the desert fringe, in the desert proper these species are rarely, if ever, available, and the need for spearwood must be met from a variety of sources. The following list indicates the observed plant varieties used for this purpose in the Western Desert in 1966–1969:

Aboriginal Name	Species Name	Part Utilized	Habitat
yutjanpa	*Pandorea doratoxylon*	stem	rocky gorges
wanaṛi	*Acacia aneura*	branch	sandplains, conglomerate knolls
piltjarpa	*Acacia aneura*	branch	sandplains, conglomerate knolls
mulaṭi	*Acacia dictyophleba*	stem	sandhills
tjawu	*Acacia* sp.[1]	root	sandplains

Of these five plant-varieties, *mulaṭi* was the least commonly encountered, and, at the same time, the most highly prized by the aborigines for its suppleness and strength. I have seen groves of this thin-stemmed tree only in the sandhill country in the vicinity of Lake Percival and to the east of Jupiter Well, but my Nyatunyatjara-speaking informants have told me that it occurs in scattered places in the sandhills to the west of the Rawlinson Range as well. In terms of preference, *tjawu* and *yutjanpa* are rated about evenly by the desert aborigines, below *mulaṭi*. *Wanaṛi* and *piltjarpa* (two clearly different varieties of mulga, despite their same species classification) are disliked for their brittleness but are used when nothing else is readily available.

Specific groves or clumps of these trees are known and discussed in detail, and long trips are sometimes made to them with the main intent of securing good spearwood. Although impossible to quantify because it

[1] Thomson (1964, p. 421) recorded this tree as, ". . . a species, not yet identified, allied to *A. notalis*." The botanists at the University of Western Australia, Perth, who examined my specimens of *tjawu* reached an identical conclusion.

TABLE 1

COMPARISON OF SHAFT LENGTHS (IN INCHES) OF THROWING SPEARS FROM THE WESTERN DESERT (WARBURTON RANGES)[a] AND THE DESERT FRINGE (LAVERTON AND WILUNA)[b]

Means (Calculated from Ungrouped Data): Laverton-Wiluna Sample, 133; Warburton Ranges, 97. t = 8.84; Probability: <.001

Shaft Lengths	Laverton-Wiluna Sample	Warburton Sample
69- 79	—	1
80- 89	—	4
90- 99	—	1
100-109	1	5
110-119	8	2
120-129	5	—
130-139	15	—
140-149	7	—
150-159	6	—
Total:	42	13

[a] Lengths are for the largest (i.e. middle) shaft of composite throwing spears.
[b] All examples are single-piece throwing spears.

occurs along with food-getting and other activities, locating spearwood takes far more time than the actual manufacture of the spears. In the case of *mulaṭi, yutjanpa,* and *wanaṛi* no special knowledge is needed once the grove has been located. Each man searches the grove for branches or stems of suitable straightness and size and cuts them down. Often there are heated discussions about whether this or that tree should be cut, but in these cases it is always possible to tell about the quality of the wood simply by looking. The same is true for spearwood taken from mallee and salmon gums on the desert fringe (where immature trees with approximately the right diameter are frequently sought). *Tjawu,* however, is a special case. The decision to dig for *tjawu* roots must be made on the basis of specific clues observed in a step-by-step fashion. After the grove of *tjawu* has been located, the bark on each tree is examined closely. Trees with flaky, dry outer bark are passed over for trees with smooth, gray bark (indicative of a tree with adequate moisture in its wood). Each of these latter trees is further examined by walking around it, breaking the tips of branches and twigs at intervals all around, to determine which side of the tree has retained the most moisture (dry twigs snap off but moist ones merely bend). Finally, the ground surface on the moist side of the tree is examined on hands and knees for tiny hairline cracks or fissures radiating outward from the tree, which

are caused by the underground pressure of the root. This latter step has been described by Thomson (1964, p. 421) in connection with the manufacture of spears of "dauwo" wood by a group he refers to as the desert Bindibu living in the vicinity of Lake Hazlett.

FIG. 6. Nyatunyatjara men examining *tjawu* trees in sandplain country to the north of the Warburton Ranges, W.A.

Thus each man knows exactly where to dig and proceeds to excavate the root, which rarely lies more than 18 inches below the surface of the ground. In every case I observed, the thin outer bark of the root was stripped away with the teeth immediately after the root was excavated; and trimming to the correct diameter, using a stone scraper (*purpunpa*) hafted on the end of a spear-thrower, was begun right away. Major bends in the root were removed either at once or later, in camp, by alternately heating the shaft in a small bed of hot coals and straightening by means of pressing with one foot while at the same time lifting with the hands on either side (in the manner shown in fig. 9). Another technique for straightening involves building up a mound of dirt and ashes or using a rock as a fulcrum on which to rest the spear shaft while press-

FIG. 7. Nyatunyatjara man straightens *tjawu* root after removing it from ground.

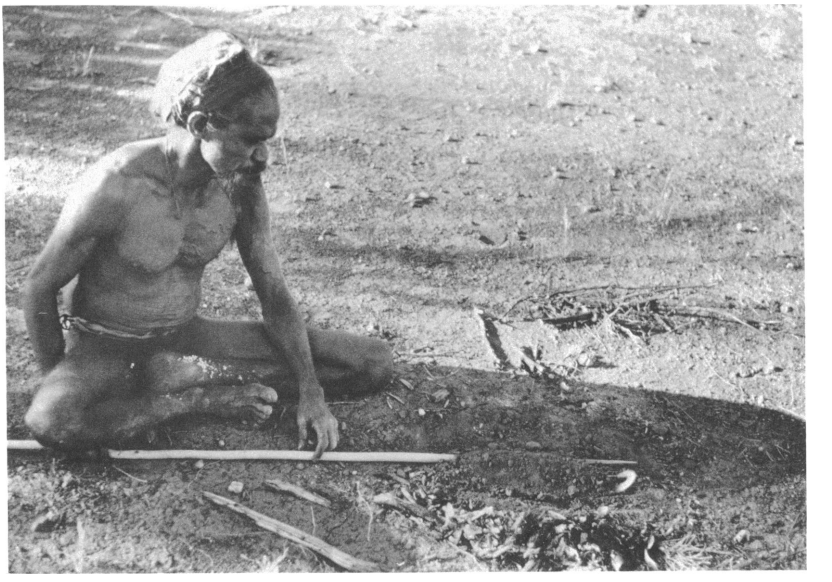

FIG. 8. Heating a spear-shaft of *mulaṭi* wood in hot coals of a small fire before straightening.

FIG. 9. Applying foot pressure to straighten spear shaft of *mulaṭi* wood.

FIG. 10. Ngatatjara men at Laverton, W.A., using "notching" technique to fashion spear shafts from thick pieces of mallee and salmon-gum wood.

ing downward by hand on both sides. In any case, major straightening is done while the root still retains some moisture. The same technique is also applied when major straightening is needed for the other types of spearwood. In the case of minor straightening, however, it usually suffices for the man to clamp the spear shaft in his teeth and use his

FIG. 11. Ngatatjara man collecting stems of immature salmon-gums (*E. salmonophloia* in area to south of Laverton, W.A.

hands to bend the rest of the shaft up and down until it is straight. Spears of any kind which have become warped can be straightened again by rubbing them with emu fat and heat-treating them in the manner described above. I found that to make a spear of *tjawu,* from the time the wood is selected until the spear is ready to use, takes about five hours of continuous, unhurried work, a figure that compares closely with the "four to five hours" indicated by Thomson (1964, p. 420). However, spears made from other kinds of wood take far less time, averaging two to three hours of continuous work. This is mainly because the pieces of wood selected from above ground are usually straighter than even the best *tjawu* roots and, hence, do not require a lengthy process of straightening.

At Laverton it was noticed that men often obtained thick branches of mallee or salmon gum which they split lengthwise using steel axes and impromptu wooden wedges, thus obtaining two or even, in some cases, three spear shafts from a single branch. Even after splitting, these pieces were still thick enough to require major trimming which was accomplished by notching at about one-foot intervals and removing the wood from between each notch (fig. 10). In spite of the fact that the traditional desert aborigines still use wooden wedges in butchering game and removing slabs of mulga wood for making spear-throwers, I strongly suspect that this notching technique for making spears is a post-European-contact development. Steel tools are less essential if immature mallee or salmon gums are used, since the diameters of the branches are closer to those of the finished spears, require less heavy trimming, and can, therefore, be shaped more easily by means of traditional stone tools. Thus it seems probable that the traditional technique for making mallee and salmon gum spears in this desert-fringe area relied more on the use of immature trees than is the case today (see fig. 11).

Of special interest is the "signature mark" (*ngamiri*)[1] applied to the spear shaft, usually by incising with a stone flake somewhere close to the tip. This mark usually appears as the last step in manufacture. Each man makes his own design so that, in the event he loses his spear in the bush, someone finding it will recognize the mark and return it to him. I have seen this occur several times. In a face-to-face society like that of the desert aborigines, everyone in camp knows the different marks and

[1] At Laverton and Mt. Margaret the term, *katiri,* is sometimes used to describe this incised design. This word is probably an aboriginal adaptation of the English word, cut, and its use reflects the greater intensity of white contact the aborigines there have in comparison with people living at Warburton and the desert country to the north.

keeps track of exchanges of spears between kin, so he knows who the current owners are. I have sometimes heard the opinion expressed by whites that these designs serve as "ownership marks" to let a man identify a spear which may have been stolen. Actually, theft of this kind is unheard of, partly because there is no need (through the rules of kin-sharing a man can always obtain a spear from a relative if he needs one) and also because the marks on his spears are so well known in the community that theft is prevented by the knowledge that it would be discovered immediately. Figure 12 shows a variety of these designs copied from throwing spears observed at Laverton and Warburton.

The tip (*tjirkaḷi*) of the composite spear is always made from a piece of mulga wood about 7 to 10 inches long. The point is sharpened by means of a hafted stone adze or, if one of those is not handy, a hand-held stone flake. Mulga wood is exceedingly hard to cut across the grain, so it often happens that the tip is charred in the coals of a small fire before being scraped by the stone tool. The charring serves to soften the outer layer of wood, making it easier to scrape away; the process of alternate charring and scraping may be repeated several times until the desired shape is reached. At no time did I ever see fire used to harden the tip of a spear in the manner claimed for the Pitjantjatjara-speaking aborigines at Ernabella, South Australia, by Hilliard (1968, p. 119).

The bindings used to attach the different segments of the composite spear are strong and rarely give way in use. In fact, it is the spear shaft itself that generally breaks, most commonly in the rear segment close to the hole that engages the spear-thrower hook. During a normal throw, the vibration of the rear third of the spear is intense, as shown in a high-speed photograph taken during a throw (fig. 13b). A too-long rear piece of a composite spear would tend to break easily owing to this intense vibration, and this may account for the over-all shorter length of composite desert throwing spear as compared with the single-piece throwing spear of the desert fringe.

There are three steps involved in making a binding. First, the two ends to be fastened together are trimmed obliquely to overlap at the joint. Then the surfaces to be joined are thickly coated with resin made either from spinifex (*Triodia pungens*) or blackboy (*Xanthorrhoea thorntonii*) and attached to each other. The adhesive hardens as it cools, and in a few minutes the joint is ready for the final step. A long strand of kangaroo or emu sinew, moistened by previous mastication, is bound tightly around the joint and allowed to dry. The sinew shrinks as it dries, further tightening the bind. When the materials are at hand, this process takes only about 10 to 15 minutes. The same method is used to repair

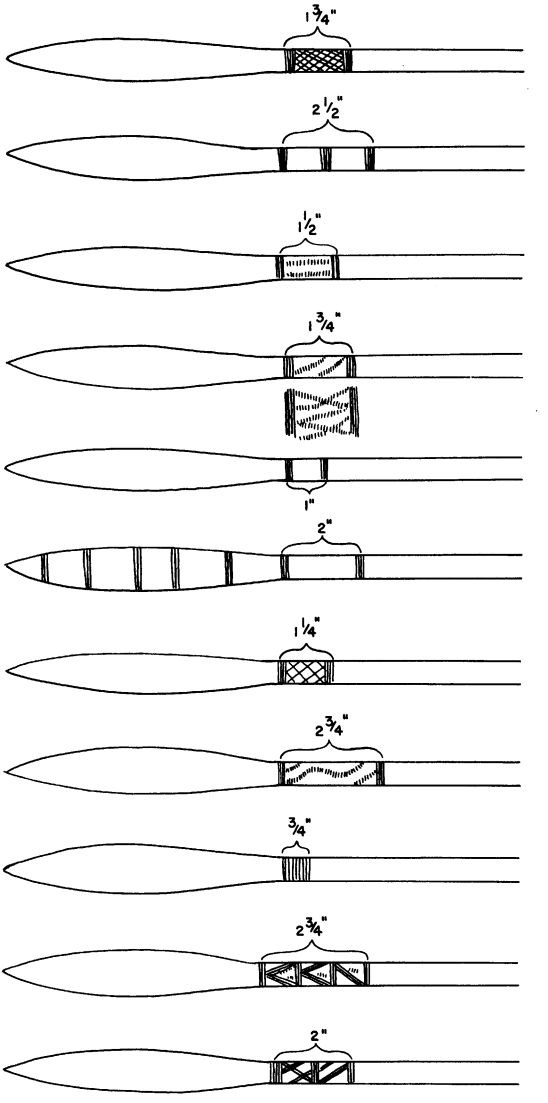

FIG. 12. "Signature marks" on Western Desert spears.

a single-piece spear which has suffered a break, but in repairing composite spears the damaged section is removed completely and a new one attached.

Throwing spears are seldom, if ever, used without the aid of a spear-

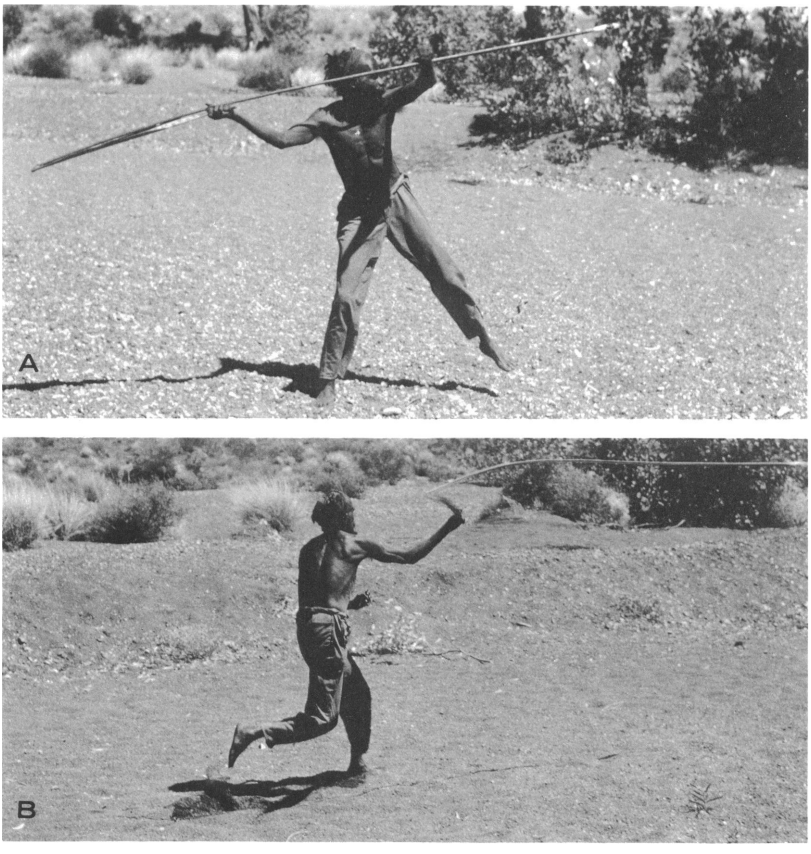

FIG. 13. A. Nyatunyatjara man demonstrating use of the spear-thrower, Warburton Ranges, W.A. B. Spear is about to leave spear-thrower. Note sharp bend in the rear part of the spear (indicating a point of severe mechanical strain).

thrower, even at very close range when, for example, a hunter has concealed himself behind a blind and allowed his quarry to approach to within 30 feet of him. In testing the efficiency of spears thrown by means of spear-throwers I found it useful to organize several contests among aborigines at Warburton and Laverton. In the course of these contests I found that men who had kept in practice with the spear-thrower and still used spears regularly in hunting could consistently hit a 2-foot by 2-foot square cardboard target at a range of between 110 and 130 feet. On most occasions the spear was allowed to fly directly to the target, but at times a man would allow his spear to skim off the surface of the

ground and bounce up into the target. Although long-distance throws of over 100 yards were observed, these were completely inaccurate. The optimum distance with accuracy was approximately 120 feet. A throw of this latter distance is usually attempted only when stalking an animal in the open. When hunting from concealment (the preferred method in the Western Desert) the range is generally closer.

The use of spears for hunting is on the wane in the Western Desert today. In places like Laverton and Wiluna the .22-caliber rifle has almost completely supplanted the spear as a hunting weapon, and rifles are becoming increasingly common at Warburton, too. Nevertheless, in 1966–1967, the majority of men living at Warburton or in the desert regions to the north used spears for hunting, and we encountered several families of Nyatunyatjara-speaking aborigines who had never seen rifles used before 1965. At Laverton the principal use for spears was in fighting to settle quarrels. In most such exchanges the antagonists in a serious dispute hurled or thrusted spears at each other until each succeeded in spearing his opponent through the thigh. At times, as in the case of a young man who married a woman who was of the correct section but not betrothed to him, the victim did not retaliate when his father-in-law speared him in the thigh. Spearings arising from cases like the above do not generally involve much anger, but real fury can occur during fighting to settle quarrels, not only between the antagonists but also among their kin. It becomes evident to any observer who stays long in the vicinity of a small aboriginal reserve like Laverton, that crowding, and the fact that large numbers of people are together for a long time (almost on a permanent basis) are conducive to quarrels, and, ultimately, spearings.

The 1967 census shows that there were 336 aborigines residing at Laverton (30 part-aborigines and 306 full bloods) with slightly more present during 1966. This is a much larger and more permanent gathering of people than any known under traditional nomadic conditions in the Western Desert (except possibly for unusually well-watered areas such as the Musgrave Ranges in South Australia). While we were at Laverton, spearings were frequent. There is a small government hospital at Laverton, and at least some aborigines with spear wounds were willing to go there for medical help. A check of the hospital records showed that from January, 1963, through June, 1966, reported spearings on the Laverton Reserve were averaging 1.05 per month over-all, with the average rising to 2.83 per month during the first half of 1966. These records do not include the aborigines who, for various reasons, did not seek medical help for their wounds at the hospital. From observation we

know there were many such cases, but it would be hard to estimate their number accurately. Yet even the minimal figures provided by the hospital records are far in excess of the rate at which spearings occur under traditional, nomadic conditions.

Spearings were much less frequent at Warburton and occurred, on an average, about once every two months. Perhaps this can be attributed to the fact that, although there were 376 aborigines at Warburton in 1966 and 454 in 1967 (according to the census figures of 1966 and 1967, respectively), conditions were less crowded than at Laverton, because the reserve is open to the desert and is not hemmed in by sheep stations and other properties owned by whites. Thus, when conflicts arise, it is possible for a man and his family to move elsewhere as an alternative to fighting.

My informants emphasized that the thrusting spear (*winta*) was intended mainly for fighting, but in fact I seldom saw these spears in use at all. Instead, barbed thrusting spears were used both for hunting and fighting in most instances, and this often increased the seriousness of the wounds. Sometimes the mulga wood point of the spear struck the femur, splintering upon impact and causing an excruciating wound full of slivers. More commonly, the barb got stuck in the wound behind a muscle or ligament. In such cases the point was either dismantled in the wound, or the entire spear was drawn through the leg to avoid pulling on the barb. Sometimes a bit of the sinew binding the point or the barb was accidentally left in the wound where it festered. One Ngatatjara man living at Warburton today told me how he lost his leg as a result of this type of complication. And in recent years at least four fatalities are known to have resulted at Warburton from spearings in which an artery was severed and the bleeding could not be stopped in time. Although in most cases spearings serve as a painful but basically harmless way of settling quarrels and social grievances, the risk of serious injury or death is always present.

Spears have a certain symbolic quality in these encounters. When the commotion begins, the relatives of the antagonists arrive, each armed with as many as six or seven spears, which they shake and rattle as they argue loudly for their side's cause. This is many more spears than one would ever need no matter how serious the conflict, and the purpose is clearly to daunt the opposition. Another threatening device is for a man to lunge toward an opponent as if about to hurl a spear but without actually engaging the spear-thrower hook to the spear. He snaps the spear-thrower and catches the spear as it drops by his side. Spears in these cases are intended to represent a show of force. The opposite is

true on occasions in which two groups of aborigines come together when the intentions are peaceful, as, for example, when ceremonies are to be held. When this occurs, the men from the visiting group approach the resident group in a body and alternately run and walk together chanting and carrying their spears upright with the points facing down and clasping them near the points (a gesture of peaceful intent, since spears cannot possibly be thrown from this position). A scene showing the approach of a group of this kind was photographed by Tindale at the Warburton Ranges prior to ceremonies held there in 1935 (Tindale and Lindsay, 1963, fig. 95). The men of the resident group stand together holding their spears in much the same way as described above, as the visiting men circle them. In meetings of this kind these preliminaries are followed by other ritualized activities, like the act of penis-holding, intended to anticipate and settle potential conflicts between members of the two groups before the visitors make camp and join in the ceremonies. Thus the symbolic threat of force represented by the spear can, on certain occasions, be reversed to indicate a lack of hostility. However, it is worth remembering that the visitors and residents, despite their peaceful gestures, are still armed and give the appearance of being ready to fight if their peaceful overtures are spurned and trouble erupts.

The aborigines of the Western Desert lack any kind of organized warfare, although small war parties organized along kin lines sometimes travel long distances to fight over issues like an elopement or the violation of a sacred site. These parties travel openly and are called *warmala,* as opposed to the revenge expedition, or *tjinakarpil,* which travels under cover of night and employs sorcery along with the use of emu-feather footpads to cover the footprints (the Western Desert equivalent of the Aranda *kurdaitcha* described by Spencer and Gillen, 1899, pp. 476–485). The principal weapon of the *warmala* is the spear, in conjunction with the spear-thrower and shield. Strategies for fighting vary, but one of the most popular methods described by my informants was said to be a ruse in which the spear is laid on the ground where it can not be seen in the tussock-grass and is fitted between the first and second toes. In this manner a man can slide the spear along under his foot, concealing it from his enemy until he is close enough to throw. Elkin (1964, fig. 10) shows an aborigine (locality not given) demonstrating this ruse in a manner identical to the demonstrations provided by my Ngatatjara informants. If this technique were really as common as these informants claimed, it would mean that the display by a group of visitors making a peaceful approach, with their jogging gait and upraised spears, must have been a reassuring sign that no spears were hidden in the grass.

The sight of an apparently unarmed male visitor approaching camp was probably cause for alarm, to be allayed only by the elaborate rituals of the approach and penis-holding.

USE AND MANUFACTURE OF SPEAR-THROWERS

In terms of portability and multiple functions, no aspect of material culture epitomizes the nomadic life of the Western Desert aborigines as completely as the spear-thrower. Most Ngatatjara-speakers call this device *miru,* but Ngatatjara- and Nyatunyatjara-speakers living in areas to the north of the Warburton Ranges more frequently refer to it by the term, *langkuru.*

General descriptions of the Western Desert spear-thrower appear in Mountford (1962, pp. 181–182); and Hilliard (1968, p. 101). These descriptions correctly point out that the desert spear-thrower has several functions in addition to throwing spears. From my own observations I list these functions as follows: 1) a friction stick in fire making; 2) a woodworking tool with a hafted stone adze-flake; 3) a mixing tray for pigments and/or tobacco; 4) a percussion instrument for rhythmic tapping in songs and dances; 5) a device for scraping a patch of ground clean of thorns and pebbles when preparing a campsite; 6) a mnemonic device for helping recall the sequence and locations of waterholes and other geographic features.

There is considerable variation in the way individuals throw spears with the spear-thrower. The universal method of grasping the handle of the spear-thrower (along with the spear) is shown in figure 14. This technique has been described by R. M. Berndt (1940, p. 290) for the desert aborigines residing at Ooldea, South Australia, and I could find no exceptions to it anywhere in the Western Desert. However, the method of lifting the spear and the stance during the throw varies. Some individuals prefer to steady the spear shaft with their free hand or allow the shaft to rest on their wrist during the throw, whereas others are content to support the spear entirely with the one hand holding the spear-thrower handle. For some the favored stance during the throw is fully upright, in some cases even on tiptoe. Some of those who prefer this upright stance lift their front foot off the ground and rock back in order to gain momentum for the throw (fig. 13A). Others crouch slightly during the throw. There are some individuals who like to take a few short running steps before throwing.

To make fire with a spear-thrower, the first step is to find a medium-sized branch of dead, dry mulga and split it partway along its length

FIG. 14. Demonstration of spear-thrower grip, Warburton Ranges, W.A.

(as a rule, dead mulga splits this way naturally, but the split may need to be enlarged until it stands ¼ to ½ inch wide at a point halfway along the length of the branch). The branch is then laid flat on the ground with the split oriented vertically and held open by one or two small wooden wedges. These wedges are usually long enough to be driven downward through the split into the ground, thus anchoring the branch to the ground. At this point, one man carefully places his feet on each end of the branch and stands upon it, further anchoring it. He remains standing in this position, keeping as still as possible, while another man places a few pinches of dried kangaroo dung in the open split and lays an edge of his spear-thrower across it at right angles. Either by himself or with the help of a third man pulling from the other end of the spear-thrower, he presses the weapon hard against the branch and draws it rapidly back and forth at a point directly above the bits of shredded dung. After 15 to 20 seconds, the dung begins to smolder, and a glow appears. Immediately, one of the men places a small bundle of dry grass directly above the glow and blows on it, causing the tinder grass to ignite.

This technique is effective even when the mulga wood is damp from rain, though it may take up to a minute to produce a flame. Although Tindale has observed an aborigine using a stick drill to make fire at Mt. Liebig, Northern Territory (Tindale and Lindsay, 1963, figs. 34

FIG. 15. Nyatunyatjara man using a stone adze-flake hafted to the handle of a spear-thrower to trim a *tjawu*-root spear shaft.

and 35) and Mountford and Berndt cited evidence to suggest that fire making by stone percussion was known among the aborigines of the Victoria Desert (Mountford and Berndt, 1941, p. 344), for all practical purposes the only method of making fire currently in use or known to the Western Desert aborigines is by friction, using a spear-thrower or, in some cases, a throwing stick (*walanu*) with a narrow edge like that of a spear-thrower.

When using the stone adze flake (*purpunpa*) hafted to the resin handle as a wood scraper, a distinctive motor pattern is employed, in which the operator grips the handle with one hand and, balancing the spear-thrower upright at an angle of between about 30 and 60 degrees, draws the scraping edge of the adze along the surface of the work toward his body (fig. 15). The operator works in a seated position on the ground and repeats this process, removing wood shavings as he shapes the object. The upraised part of the spear-thrower acts as a counterbalance to steady the work. In observations made by the author to measure the efficiency of this tool, it was found that it took roughly twice as long to accomplish a woodworking task this way as it did with metal tools used in the same way. This included the time taken periodically for resharpening the stone adze flake. Thomson (1964, p. 418) also mentioned that this hafted stone flake was used for cutting sinews and quartering large game, by the group he terms the desert Bindibu, but at no time during our stay in the Western Desert did my wife or I observe a hafted adze flake used in this way. Among the Ngatatjara and Nyatunyatjara these tasks were accomplished by means of hand-held stone knives (*tjimari*) and wooden wedges called *pilpa* (Gould, 1968, pp. 46, 47).

Most of the other listed uses of the desert spear-thrower are self-explanatory, except for the final one, that of the spear-thrower as a mnemonic device. Decorated spear-throwers with elaborate incised designs are particularly characteristic of the Western Desert people, and have not been described much in the literature. Thomson (1962, p. 274) described decorated spear-throwers which he said the Bindibu regard as highly conventionalized maps of the water sources in the desert region they inhabit. McCarthy (1962, fig. 47) illustrated five decorated spear-throwers from Western Australia but said nothing about the meaning of the designs. Strehlow (1964, pp. 57–59) illustrated a pair of decorated Pintupi spear-throwers and described the designs as representing a rainstorm and flood, in one case, and a whirlwind raising columns of dust, in another. In this case nothing resembling a "map" function is attributed to these designs.

Thus it was clear when I began these studies that further collection and analysis of decorated Western Desert spear-throwers was needed to resolve the apparent contradictions in the literature and to observe a wider range of this mode of decorative art. To this end, a collection of 29 decorated spear-throwers was made, with detailed documentation concerning the designs. One of these spear-throwers was collected from a Ngatatjara man at Mt. Margaret Mission, and the rest were from either the Warburton Ranges or the desert to the north, mainly in the Clutterbuck Hills and the Rawlinson Range.

The illustrated specimens show a variety of design styles including concentric circle, interlocking concentric rectangle, zigzag, herringbone, and other motifs. In some cases the designs are semipictorial, although in most cases they are conventionalized and depict landmarks and water sources rather than objects or animals. Individual elements of important sacred story lines (such as the carpet-snake tradition) are depicted in more than one style on different spear-throwers. Despite the fact that spear-throwers are carried about openly in camp and on journeys, they bear sacred designs which are not explained to women or uninitiated men. They are normally discussed only in the context of a sacred gathering. Simply to call them maps as Thomson did fails to do full justice to the complexities represented by them.

Each place name indicated in the illustrations is a sacred site along the dream-time track of a particular totemic being. For a detailed discussion of the relationship of these totemic beings to cult lodges and ceremonial behavior in the Western Desert, one should consult Berndt (1959). Most of the place names pertain to water sources, although there are several which refer to localities where no water is present. Each

locality has a short song connected with it which evokes a particular episode in the dream-time travels of the totemic ancestor being commemorated. The songs are sung in a sequence reenacting the dream-time route, and the singing serves as an act of veneration by individuals who claim patrilineal descent from the totemic ancestor whose track or paraphernalia is depicted on the spear-thrower. Some totemic beings have wider significance than others, such as the kangaroo (*maḷu*) and dingo (*papa*) traditions (which are learned by all novices before circumcision, regardless of their particular cult-lodge affiliations) and the mythical water snake (*waṇampi*), and are frequently depicted on spear-throwers, too. These designs also occur on carved sacred boards and bullroarers which are kept hidden in caches except when needed for ceremonial occasions.

To the aborigines, the singing and discussion of these songs is primarily a sacred act. Sometimes the owner of the spear-thrower points to each design as he sings the song connected with it, moving from one to the next and occasionally interrupting to discuss the significance of the song with the others present. Although Thomson mentioned the presence of place names in Bindibu singing (1962, p. 274), he did not discuss the sacred quality of these songs, and implied that the designs on the spear-throwers are consulted in a completely utilitarian fashion.

The "map" function of these designs is secondary, arising from the way in which useful information about the sequence and localities of water sources and landmarks is memorized in the context of the sacred life. Because of its portability and general usefulness the decorated spear-thrower can be kept handy as a reminder of the correct names, sequence, and localities of sacred water sources and landmarks. In this sense it is more like a map in Thomson's sense of the word than a sacred board or bullroarer, which is accessible only where it is cached.

This interpretation makes it easier to understand two aspects of aboriginal behavior connected with decorated spearthrowers:

1. Only initiated (i.e. circumcised and subincised) men make or use these instruments. Only these men have progressed far enough in the sacred life to have been taught these sacred traditions and know enough about them to be permitted to learn about the traditions of cult lodges other than their own (with, of course, a resulting increase in the extent of geographical knowledge). Thus, decorated spear-throwers and sacred boards can serve a teaching as well as mnemonic function when they are shown to novices or initiated visitors to acquaint them with the sacred traditions they depict. Women and children are excluded from learning the meaning of these designs, a point which would not apply

if these were true maps. Since the memorization and transmission of most sacred totemic traditions is carried out entirely by initiated men, the sacred designs connected with these traditions are associated with an exclusively male object, the spear-thrower.

2. Designs other than strictly geographical representations appear on several spear-throwers, in this case on seven of the 29 examples in this collection. However, these non-geographical designs portray only sacred subjects such as the digging stick carried by the totemic Pleaides, the watersnake, or the dance grounds used during initiations of novices. Strehlow (1964, pp. 57–59) did not mention any sacred themes connected with the two decorated Pintupi spear-throwers he illustrated, but on the basis of the evidence cited here one would expect these to have sacred connotations of some kind.

Thomson mentioned that among the Bindibu, spear-throwers were also used as digging implements and for deflecting spears (Thomson, 1964, p. 416). I observed neither of these practices in the Western Desert, but there is no reason to doubt that such relatively impromptu uses for spear-throwers do occur at times. In the case of Ngatatjara-speaking and Nyatunjatjara-speaking aborigines, a specially made fighting shield (*tjaṛa*) is used to deflect spears, but no doubt there are occasions when a shield is needed but is not readily available and a spear-thrower might serve instead.

A total of 36 spear-throwers (not including children's spear-throwers) was collected for the American Museum of Natural History at Wiluna, Mount Margaret, Laverton, Warburton, and the desert country north of Warburton. For these, lengths vary from 28½ to 35½ inches, with a mean of 32 inches; widths vary from $2\frac{2}{5}$ to 5 inches, with a mean of $3\frac{7}{10}$ inches; and weight extremes range from 10 to 19 ounces, with a mean of 14 ounces. Although far from uniform either in size or weight, all these spear-throwers are light and easy to carry.

Spear-throwers are made by removing a slab of wood from the trunk of a fairly large and straight mulga tree. Work begins with a simple *V*-shaped cut at the base of the slab. In most cases nowadays this is made with a steel ax, but Thomson has described how this was done with stone handaxes by aborigines in the Walter James Range (1964, pp. 411–413). A wooden wedge is inserted in the cut to start prying the slab away from the tree trunk, and additional wedges are inserted along the sides of the slab as it begins to lift away. Some individuals prefer to pull the slab away without making any cut at the top while others make an upside down V cut at the point where they detach the slab from the tree. Those who do not make such a cut trim the end of the

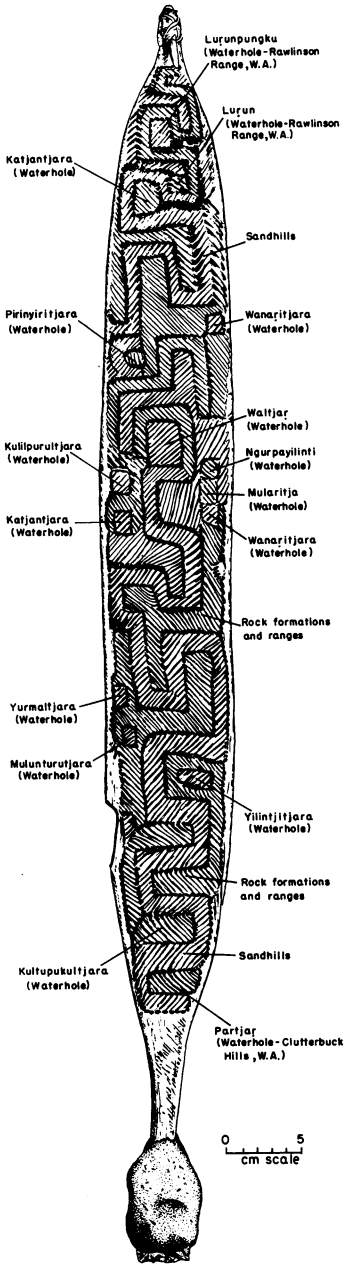

FIG. 16. Decorated Nyatunyatjara spear-thrower. Designs depict waterholes and landmarks along track of totemic snake (identification uncertain, probably the mulga snake, *Demansia textilis*). A.M.N.H. No. 80.1/4754.

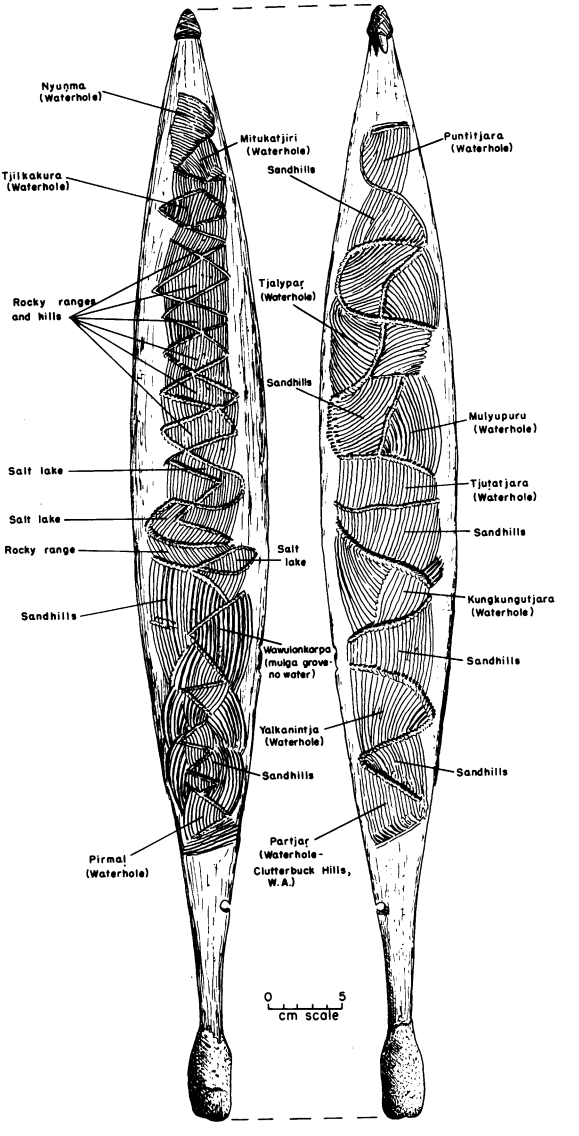

FIG. 17. Two sides of decorated Ngatatjara spear-thrower. Designs depict waterholes and landmarks along track of totemic marsupial cat (*Dasyurinus geoffroyi*) in region north and west of the Rawlinson Range, W.A. A.M.N.H. No. 80.1/4774.

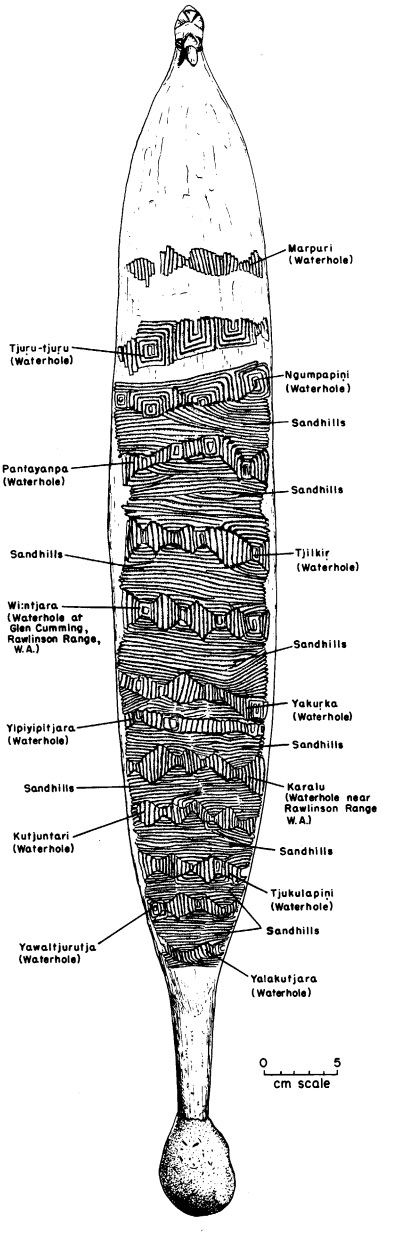

FIG. 18. Decorated Ngatatjara spear-thrower. Designs depict waterholes and landmarks along track of totemic Yula ("penis") in the vicinity of the Rawlinson Range, W.A. A.M.N.H. No. 80.1/4778.

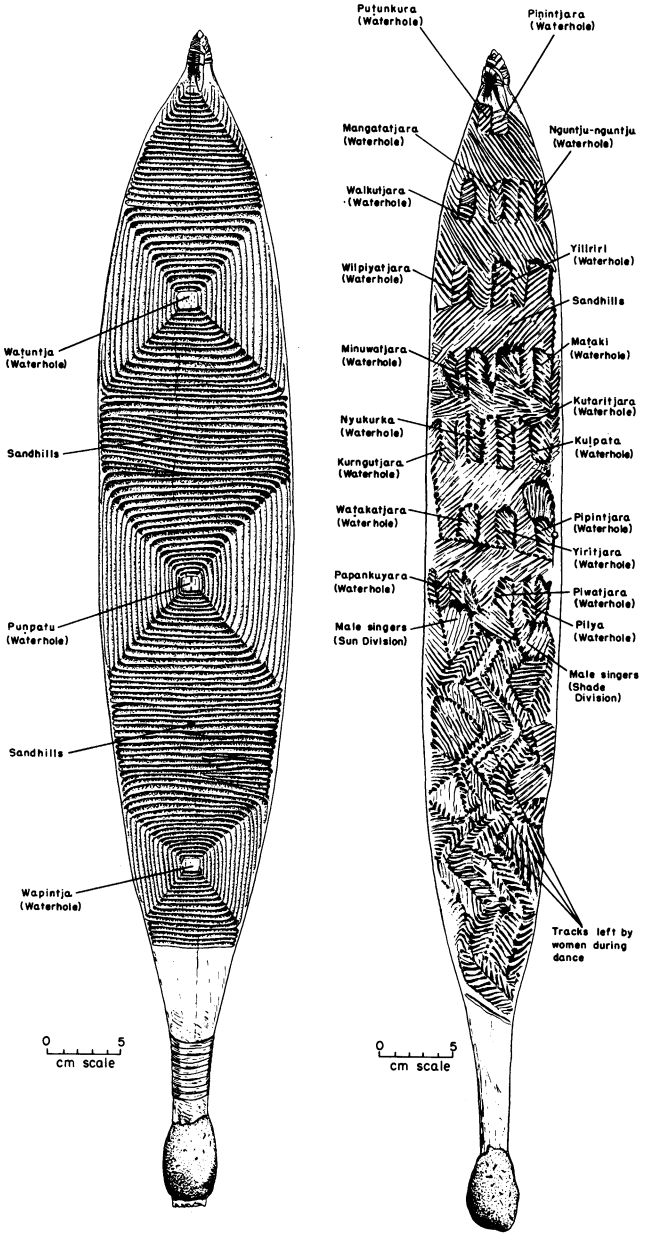

FIG. 19. Decorated Ngatatjara spear-thrower (left). Designs depict waterholes and landmarks along track of totemic opossum. A.M.N.H. No. 80.1/4793.

FIG. 20. Decorated Ngatatjara spear-thrower (right). Designs depict waterholes and dance ground along track of totemic carpet snake (*Morelia spilotes*). A.M.N.H. No. 80.1/4785.

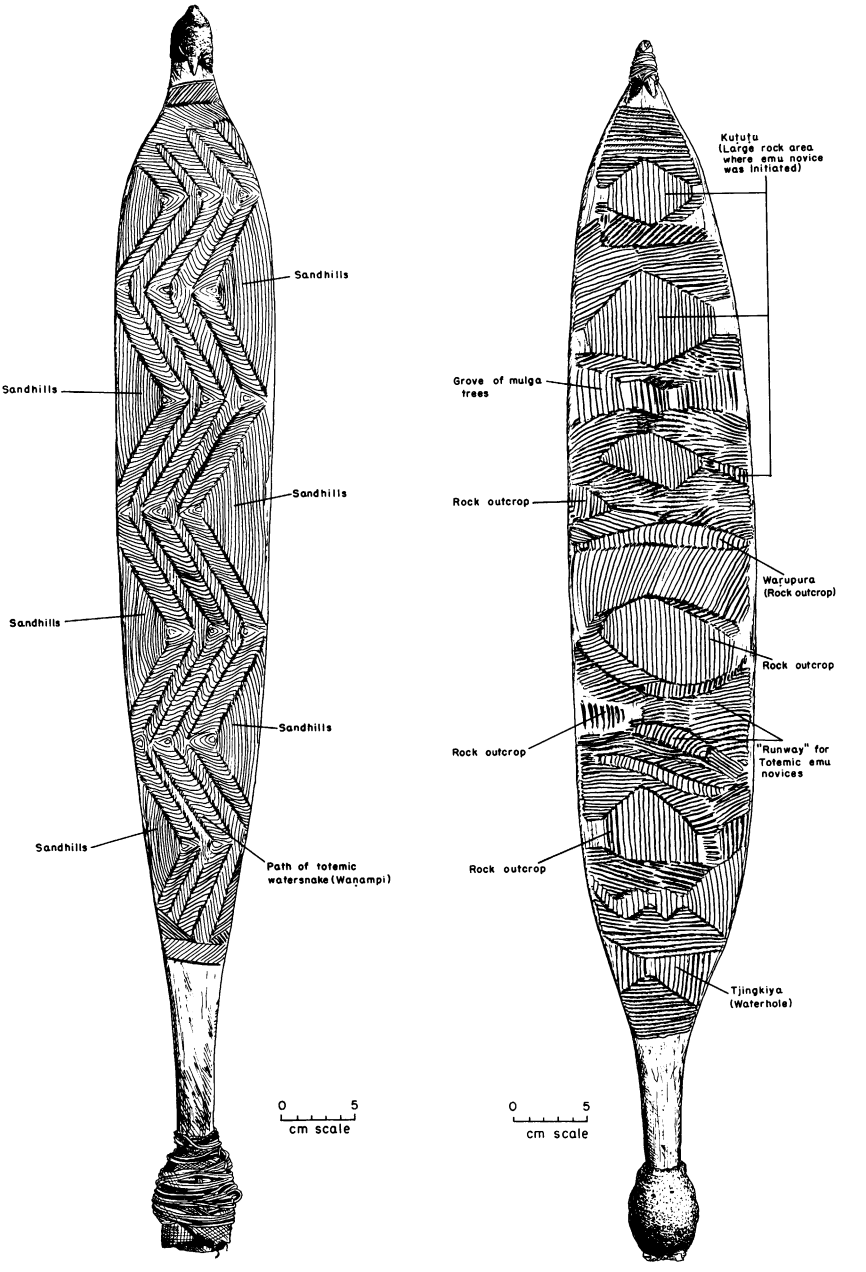

FIG. 21. Decorated Ngatatjara spear-thrower (left). Designs depict track of totemic water snake (*waṇampi*). A.M.N.H. No. 80.1/4804.

FIG. 22. Decorated Nyatunyatjara spear-thrower (right). Designs depict initiation ground of totemic emu (*Dromaius novae-hollandiae*) novices at a waterhole called Tjingkiya. A.M.N.H. No. 80.1/4795.

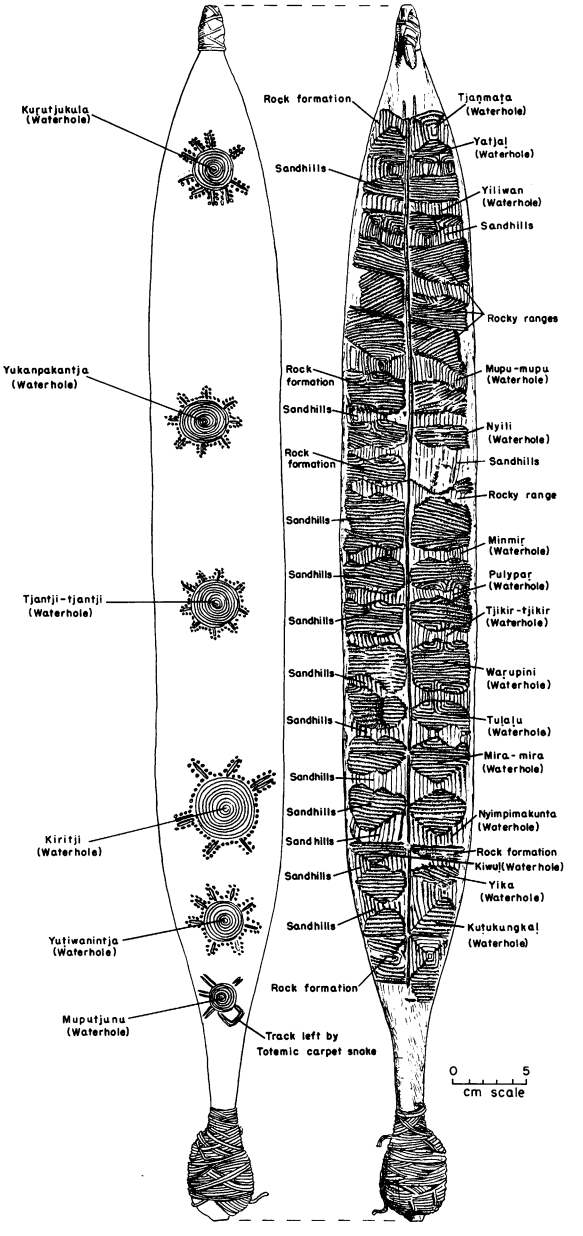

FIG. 23. Two sides of decorated Nyatunyatjara spear-thrower. Designs depict waterholes and landmarks along track of totemic carpet snake (*Morelia spilotes*) in region north and east of the Clutterbuck Hills, W.A. A.M.N.H. No. 80.1/4779.

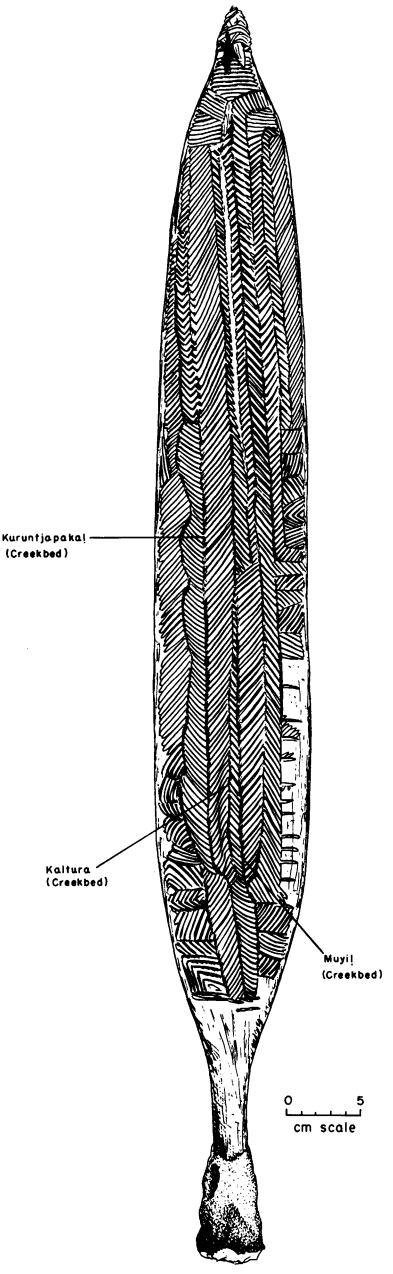

FIG. 24. Decorated Ngatatjara spear-thrower. Designs depict creekbeds along track of totemic Pleaides (part of the Yula myth) near the Dean Range, W.A. A.M.N.H. No. 80.1/4784.

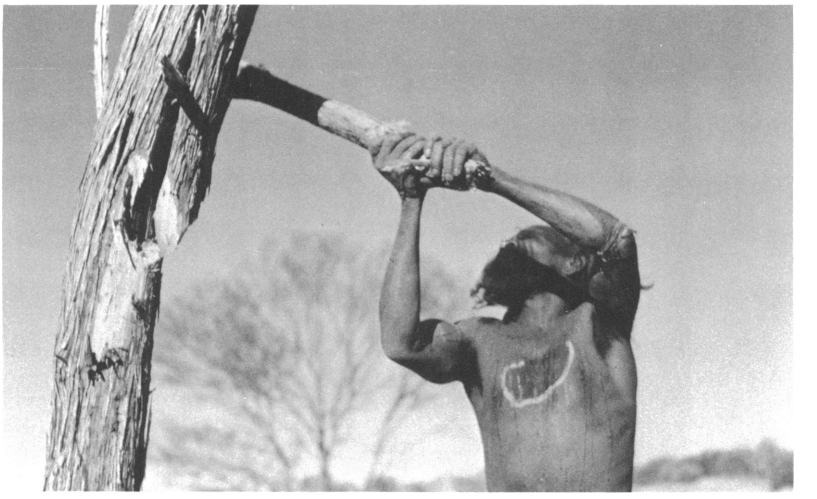

FIG. 25. Nyatunyatjara man removes slab of mulga wood for a spear-thrower blank with wooden wedges. Initial cut was made by steel ax.

slab after removal. Identical methods were observed whenever stone handaxes were used to obtain slabs of mulga wood for making spear-throwers.

Preliminary shaping of the slab is done with stone handaxes (or today, with steel axes) until the blank is uniformly ½- to ¾-inch thick over-all. At that point the hafted stone adze on the end of a club or another spear-thrower is used to complete the trimming. Using stone tools, this latter process takes between 8 and 9 hours of continuous work to complete (including time taken for resharpening the stone adze-flake). Thomson, in his observations of the Bindibu, has stated, "In practice, the mounted adze stone on the spear-thrower is, among these people, a graving tool, a spoke-shave, and a hafted cutting implement, the only mounted stone tool they possess. It is used as a knife in extracting the sinews from a kangaroo or emu, or for quartering large game. But it is primarily a *maintenance* implement, used for *repairing* rather than for making implements." (Thomson, 1964, p. 418). The Ngatatjara- and Nyatunyatjara-speaking aborigines observed in this study never used the hafted adze-flake for butchering game or cutting sinew. They differed further from Thomson's Bindibu by using the stone adze for both manufacturing and maintaining wooden implements, such as spear-throwers. The distinction drawn by Thomson does not apply to the Western Desert aborigines described in this study.

FIG. 26. Undecorated Pitjantjatjara spear-thrower showing repairs. A.M.N.H. No. 80.1/4796.

FIG. 27. Nyatunyatjara woman heats spinifex resin with piece of burning mulga bark, Clutterbuck Hills, W.A.

The barb of the throwing spear and the spear-thrower hook (both called *mukulpa* and identical in manufacture) are each made from a stick of mulga or some other species of *Acacia.* Each adult man has a hole through the septum of his nose (one of the physical ordeals preliminary to circumcision) which heals closed if it is not kept open by the insertion of a nose-bone or a stick. It is common practice for these desert aborigines to insert an extra carved *mukulpa* stick in the nose-hole, both to keep it open and because it serves as a convenient place to carry an extra one of these useful items. Most aborigines have broad noses, so the inserted stick is usually not visible unless one looks closely for it.

The final step in making a new spear-thrower consists of coating it with emu fat or a mixture of red ochre and emu fat. This keeps the wood from splitting in the dry heat of the desert, and it is done with all wooden tools. On a few occasions I have seen men spread fresh kangaroo blood over the concave surface of their spear-throwers. I was told that this was intended as a form of hunting magic; that is, it would help attract kangaroos to approach within range of the man's weapons. However, I found no evidence to show that the aborigines attach any special significance to the red ochre they sometimes apply to spear-throwers. Small cracks in the spear-thrower are repaired by placing a blob of spinifex or blackboy resin to the crack, to keep it from expanding. A large crack requires that holes be drilled through the wood on either side of it and resin drawn tightly through the holes to bind the

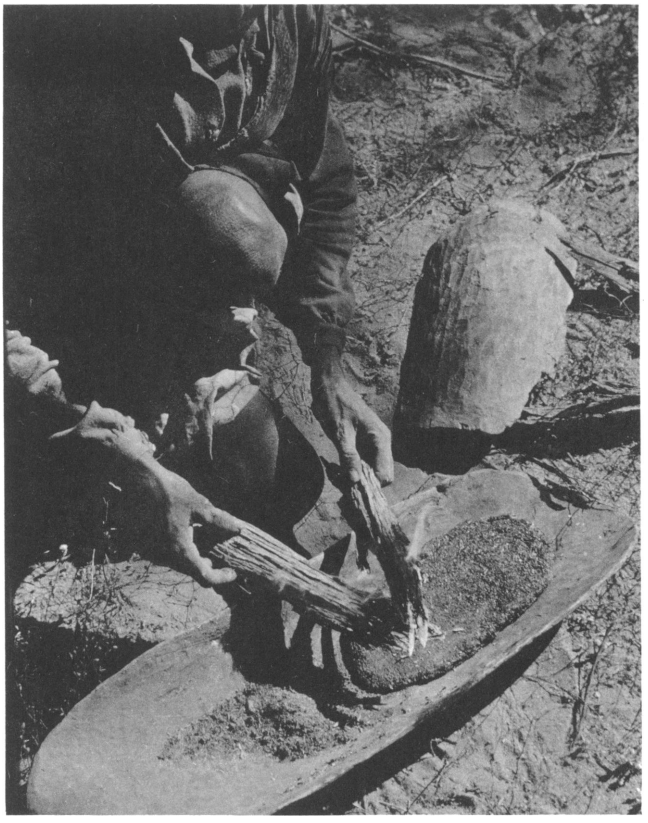

FIG. 28. Forming a cake (*nyuma*) of spinifex resin.

crack. This type of repair is extremely effective, and I have seen spear-throwers that have had several years of hard use after being fixed in this manner.

PREPARATION AND USE OF RESIN

The use of natural adhesive resin is an essential element in the manufacture and maintenance of both spears and spear-throwers. The use of vegetable adhesives by Australian aborigines was widespread and has been described or mentioned by many early observers (Maiden, 1890, pp. 429–444; Schulze, 1891, p. 228; Helms, 1896, p. 274; Basedow, 1925, p. 364; Cleland and Johnston, 1938, pp. 334–335). More recently, descriptions of the production of resin from spinifex by Ngatatjara-speak-

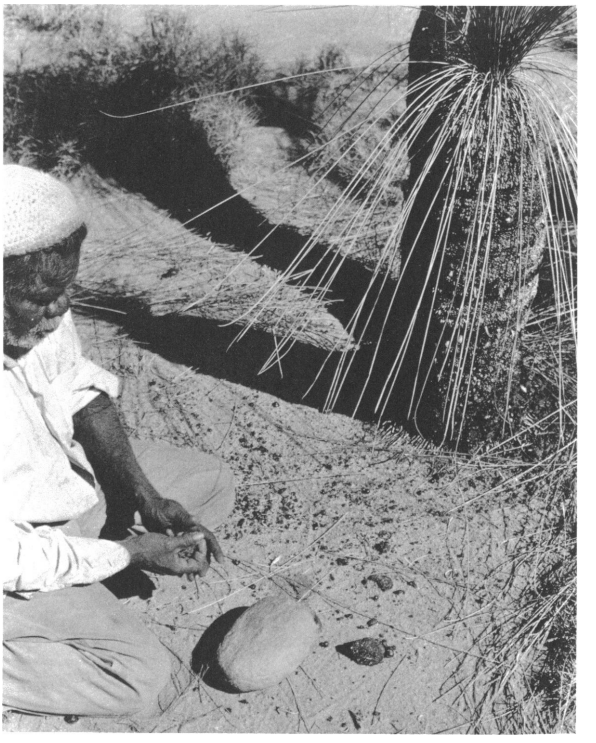

FIG. 29. Ngatatjara man removes lumps of resin from a blackboy (*Xanthorrhoea thorntonii*). Rock lying in foreground was used as pounder.

ing aborigines at the Warburton Ranges have been provided by Mathews (1964, p. 96) and de Graaf (1967, pp. 117–119).

As a rule, it is the women who prepare the spinifex and blackboy resin, but men do so occasionally. The main source of resin in the desert country around and to the north of the Warburton Ranges is *Triodia pungens,* a species of spinifex which secretes a sticky resin along its epidermis (Burbidge, 1946, pp. 224–225). The Ngatatjara name for this plant is *kuparu.* After locating a patch of this type of spinifex, the women of the gathering party find a clear patch of hard ground or a smooth and flat rocky area nearby. Armloads of spinifex are gathered and piled in heaps on this area and threshed with beating sticks. The threshing detaches the epidermal layers of resin and causes them to drop to the flat surface beneath. After beating, the clumps of spinifex are discarded and new clumps brought in and beaten. Before long a pile of mixed resin and chaff appears on the ground. This is scooped into wooden

bowls and winnowed by means of a complex rocking motion. The material thus separated may be further refined by raising handfuls of it into the air and allowing it to fall back through the fingers, while the breeze carries the lightest chaff away. At this point, the resin is usually taken to the camp while the spinifex area and heaps of threshed grass are set afire. The burning, I am told, is to make certain that new spinifex will grow vigorously after the next rains.

After it is brought to camp, the spinifex is placed in a wooden dish and heated by passing a piece of burning mulga bark back and forth above it. The heat of the close flame melts the resin lying near the top. While it is still warm, a stick is thrust into it and the end rolled back and forth in it, picking up some of the sticky mass. This is pulled off and compacted into a flat cake (called *nyuma*) which is enlarged as further blobs of resin are added. As the resin cools, the cake hardens, but it may be reheated at any time and bits of it detached as needed. Sometimes a surplus of these cakes is made and later given to various relatives. The cakes are rounded or lozenge-shaped, about ½-inch thick and 5 to 10 inches in diameter, and weigh from 10 to 20 ounces.

The blackboy, or grass tree (*Xanthorrhoea thorntonii*), also serves as a source of resin, although it is relatively uncommon in the desert areas dominated by spinifex vegetation. The Ngatatjara word for this plant is *kaṭakultu.* A rock or a wooden club is used to detach chunks of resinous woody tissue from the base of the trunk of the plant. These chunks are taken to camp where they are heated on a flat stone next to the fire until they become soft. The soft resinous material is packed into a cake or applied directly to the task at hand, such as making a haft or a repair. As it cools, particles of stone, wood, and other impurities are plucked out of the resin. At Laverton there is a short stretch of paved highway leading from the town to the now-abandoned Landsfield Mine. During the summer, pieces of soft road tar are sometimes removed by the aborigines and used for hafting and repairs to wooden implements, using the same technique as with blackboy resin.

REFERENCES

BASEDOW, H.
1925. The Australian aboriginal. Adelaide, F. W. Preece, Ltd.

BERNDT, R. M.
1940. Some aboriginal children's games. Mankind, vol. 2, no. 9, pp. 289–293.
1959. The concept of "the tribe" in the Western Desert of Australia. Oceania, vol. 30, no. 2, pp. 81–107.

BURBIDGE, N. T.
1946. Morphology and anatomy of the Western Australian species of Triodia. Trans. Roy. Soc. South Australia, vol. 70, no. 2, pp. 221–234.
CLELAND, J. B., AND JOHNSTON, T. H.
1938. Notes on the native names and uses of plants in the Musgrave Ranges region. Oceania, vol. 8, no. 2, pp. 208–215; vol. 8, no. 3, pp. 328–342.
DAVIDSON, D. S.
1934. Australian spear-traits and their derivations. Jour. of the Polynesian Soc., vol. 43, pp. 41–72; 143–162.
1936. The spearthrower in Australia. Proc. of the Amer. Philosophical Soc., vol. 76, no. 4, pp. 445–483.
DE GRAAF, M.
1967. The manufacture of spinifex gum by desert aborigines. Western Australian Naturalist, vol. 10, no. 5, pp. 116–119.
DOUGLAS, W. H.
1959. Illustrated topical dictionary of the Western Desert language, Warburton Ranges Dialect, Western Australia. Perth, United Aborigines Mission Language Department.
1964. An introduction to the Western Desert language. Oceania Linguistic Monogr., no. 4.
ELKIN, A. P.
1964. The Australian aborigines. New York, Doubleday and Co.
FORREST, JOHN
1875. Explorations in Australia. London, Sampson Low, Marston Low, and Searle.
GARDNER, C. A.
1944. The vegetation of Western Australia. Jour. Roy. Soc. Western Australia, vol. 28, pp. xi–lxxxvii.
GILES, ERNEST
1889. Australia twice traversed. London, Sampson Low, Marston, Searle, and Rivington, Ltd., vols. 1, 2.
GOULD, R. A.
1968. Chipping stones in the Outback. Nat. Hist., vol. 77, no. 2, pp. 42–49.
HELMS, RICHARD
1896. Anthropology of the Elder exploring expedition, 1891–2. Trans. Roy. Soc. South Australia, vol. 16, pp. 237–332.
HILLIARD, W.
1968. The people in between: the Pitjantjatjara people of Ernabella. London, Hodder and Stoughton, Ltd.
LEEPER, G. W.
1949. Climates. The Australian environment. Melbourne, Melbourne University Press, pp. 19–28.
MCCARTHY, F. D.
1962. Australian aboriginal decorative art. Sydney, The Australian Museum.
MAIDEN, J. H.
1890. On grass tree gum. Proc. Linnean Soc. New South Wales, ser. 2, vol. 5, pp. 429–444.

MATHEWS, A. G.
1964. The preparation of spinifex gum by Australian aborigines (Warburton Ranges). Western Australian Naturalist, vol. 9, no. 4, p. 96.
MOUNTFORD, C. P.
1941. An unrecorded method of manufacturing wooden implements with simple stone tools. Trans. Roy. Soc. South Australia, vol. 65, pp. 312–316.
1962. Brown men and red sand. Sydney, Angus and Robertson, Ltd.
MOUNTFORD, C. P., AND BERNDT, R. M.
1941. Making fire by percussion in Australia. Oceania, vol. 11, no. 4, pp. 342–344.
SCHULZE, L.
1891. The aborigines of the upper and middle Finke River. Trans. Roy. Soc. South Australia, vol. 14, pp. 210–246.
SHEARD, L.
1964. An Australian youth among desert aborigines. Adelaide, Libraries Board of South Australia.
SPENCER, W. B., AND GILLEN, F. J.
1899. The native tribes of Central Australia. London, Macmillan and Co., Ltd.
STREHLOW, T. G. H.
1964. The art of circle, line, and square. Australian Aboriginal Art, R. M. Berndt (ed.). New York, Collier-Macmillan, pp. 44–59.
THOMSON, D. F.
1962. The Bindibu expedition. The Geographical Jour., vol. 128, pts. I–III, pp. 1–14, 143–157, 262–278.
1964. Some wood and stone implements of the Bindibu tribe of Central Western Australia. Proc. Prehistoric Soc., new ser., vol. 30, pp. 400–422.
TINDALE, N. B.
1965. Stone implement making among the Nakako, Ngadadjara and Pitjandjara of the Great Western Desert. Rec. South Australian Mus., vol. 15, no. 1, pp. 131–164.
TINDALE, N. B., AND LINDSAY, H. A.
1963. Aboriginal Australians. Brisbane, Jacaranda Press.
WOOD, J. G.
1949. Vegetation. The Australian environment, Melbourne, Melbourne University Press, pp. 67–84.